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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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08/902,809    07/30/97    SCHUEGRAF

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EXAMINER

NADAV, O

ART UNIT

PAPER NUMBER

2811

DATE MAILED:

02/02/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.

08/902,809

Applicant(s)

Schuegraf et al

Examiner

ORI NADAV

Group Art Unit

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☒ Responsive to communication(s) filed on Jan 4, 2000

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 23-31 and 36-44 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 23-31 and 36-44 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☒ The drawing(s) filed on Jul 30, 1997 is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☒ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the layer of oxide must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

### ***Specification***

2. The amendment filed on 8/2/99 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: an oxide layer 215.

Applicant is required to cancel the new matter in the reply to this Office action.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 23-31 and 36-44 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claims 23-25, there is no support for a spacer terminating at a boundary between a feature and an oxide layer, yet not being in contact with the oxide layer in the specification.

Regarding claims 25-31 and 38-44, there is no support in the specification for an oxide layer forming a boundary with a feature.

Regarding claims 26-31, 36-41 and 44, there is no support in the specification for a layer of gate oxide deposited under the gate such that enabling one skilled in the art to make and/or use the device.

Regarding claims 26-31 and 36-41, there is no support for a feature over the first layer of oxide and a feature protruding from the first layer of oxide in the specification.

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Regarding a smile formed at the boundary between the feature and the oxide layer or the first layer of oxide in claims 25, 29-31 and 38, there is no support in the specification of any boundary between the feature and the first oxide layer.

6. Claims 26-31 and 36-41 and 44 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not describe a layer of gate oxide under the gate in such a way as to convey to one skilled in the art the function ability of the semiconductor device without a gate oxide.

7. Claims 26-31 and 36-41 and 44 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2173.05(I). The omitted structural cooperative relationship is: a first layer of oxide

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***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 23, 25-27, 29, 30, 36, 38, 42 and 44, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho et al. and Keller et al. (5,707,898) in view of Manning (5,804,838) or McLevige (4,711,701).

Ho et al. teach in figure 10 substantially the entire claimed structure, including an oxide layer 14, a gate electrode on the oxide layer comprising a layer of polysilicon 16 and a dielectric 20, a selectively deposited spacer 26 forming a smile effect formed only on the sidewalls of the gate and terminating at a boundary between the feature and the oxide layer, a second insulating layer 28 comprising silicon nitride (column 3, line 52) on the spacer, and a layer of oxide 22 deposited over the gate electrode.

Ho et al. do not teach a spacer comprising silicon nitride not in contact with the oxide layer.

Keller et al. teach in figure 2 a spacer covering the surface of a feature, terminating at a boundary between the feature and the oxide layer and not being in contact with the oxide layer.

Manning teaches in figure 10 a layer of silicon oxide 36 deposited on a semiconductor device, wherein spacers 48, 50 comprises silicon nitride interposed between the layer of the silicon oxide and the gate (column 5, lines 20 and 51-53).

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McLevige teaches in figure 3c a spacer 64 having a smile effect comprising silicon nitride (column 5, lines 18-20) covering the surface of a feature 142 and terminating at a boundary between the feature and the oxide layer 38.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to deposit a layer of a silicon oxide on a silicon nitride spacer not being in contact with the oxide layer in Ho et al.'s device in order to provide better protection for the device by a method well known in the art. The combination is motivated by the teaching of Ho et al. who point out that spacers can be formed of silicon nitride, and by the teaching of Keller et al. who point out that it is known in the art to form a spacer having a smile effect not contacting a boundary between a feature and an oxide layer (columns 2-3).

Regarding a second oxide spacer having a smile effect, Keller et al. teach in figure 2 that it is known in the art to form a spacer having a smile effect not contacting a boundary between a feature and an oxide layer. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a second oxide spacer having a smile, as claimed.

Regarding the processing limitations recited in claim 25 ("being formed by a polycide reoxidation"), these would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced. In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985).

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10. Claims 24, 28, 31, 37, 39-41 and 43, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho et al., Keller et al., Manning or McLevige, as applied to claims 23, 26, 30, 36, 39 and 42, above, and further in view of Gonzalez. Ho et al., Keller et al., Manning and McLevige teach substantially the entire claimed structure, as above, except a gate comprising a tungsten silicide layer interposed between the polysilicon and the dielectric layers. Gonzalez teach in figure 2 tungsten silicide layer 22 (column 4, line 63) interposed between the polysilicon 20 and the dielectric 24 layers.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to deposit tungsten silicide layer interposed between the polysilicon and the dielectric layers in Gonzalez's device, because it is known in the art to use tungsten silicide layer on a polysilicon layer in order to provide good contact to the gate.

### ***Response to Arguments***

11. Applicant argues on pages 1-2 that the courts defined 'the description must clearly allow persons of ordinary skill in the art to recognize that invented what is claimed', and "the drawings and the specification may be amended to conform to each other....within the prohibition of the law". However, in this case, the invention is not described in the specification such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Furthermore, the drawings do not illustrate layer 215 as being an



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oxide layer. Therefore, applicant can not amend the specification in order to include the phrase 'oxide layer 215'.

12. Applicant argues on pages 2-3 that there is support in the specification for an oxide layer 215, because an active area mask, as defined in two cited references, comprises an active area and an insulating area. However, applicant does not define layer 215 as an active area mask. Applicant defines layer 215 as an active area, whose meaning is well known in the art. Therefore, even if applicant's allegations regarding the definition of an 'active area mask' are correct, there is no support in the specification for an active area 215 being an oxide layer. In any event, the parameters of an active area mask should be described in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

13. Applicant argues on page 3 that an artisan would conclude from figure 2B that layer 215 is an oxide layer, because spacer 210 is formed by depositing amount less than the incubation thickness, leaving the active area free of deposition. However, spacer 210 can be formed using the same process as outlined above even if layer 215 is not an oxide layer by merely leaving the active area free of deposition. Applicant did not specify that the active area is free of deposition because it is an oxide layer.

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14. Applicant argues on page 3 that the thickness of 'oxide layer 215' defines what is the active area. However, there is no support in the specification for an active area layer 215 comprising two separate layers, wherein one of which is an oxide layer, and the location of the oxide layer depends on the thickness of layer 215.

15. Applicant argues on pages 3-4 that 'the layer of reoxidation 220' implies that layer 215 is an original layer of oxide. However, applicant refers to 'polycide reoxidation' and 'selective spacers 210 are reoxidized 220', which is not an evidence that layer 215 is an oxide layer.

16. Applicant argues on page 4 that methods claims 9 and 11 disclose forming an insulating layer on the substrate and a conductive layer over the insulating layer. However, method claims 9 and 11 recites forming an insulating layer on the substrate and a conductive layer over the insulating layer, whereas the insulating layer acts as an etch stop for forming the gate. This disclosure does not support an insulating layer 215 covering the whole top surface of the substrate, a gate electrode on top of the insulating layer 215, and reoxidized layers 220 formed on top of insulating layer 215 adjacent to the sidewalls of gate electrode 205.

17. Applicant argues on page 4 that one skilled in the art would recognize layer 215 as an oxide layer, because it consists with what is known about gate structure in CMOS devices. However, an artisan can not hypothesize the construction and usage of a claimed invention.

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Applicant must describe the subject matter in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Furthermore, one skilled in the art would not recognize layer 215 as an oxide layer, because the specification clearly define layer 215 as an active area, and it is well known in the art that an oxide layer is an insulating layer whereas an active area is a conductive area.

18. Applicant argues on page 6 that none of the cited prior art teach individually the claimed structure. However, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

19. Applicant argues on page 7 that there is no suggestion to combine the cited prior art references. However, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21

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USPQ2d 1941 (Fed. Cir. 1992). In this case, Ho et al. and Keller et al. provide motivation for combining the prior art references, as was adequately addressed on page 6 of the office action.

***Conclusion***

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

**Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center**

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located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is (703) 308-8138. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is 308-0956

Ori Nadav, Ph.D.

January 21, 2000

  
Tom Thomas  
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